WHAT IS CLAIMED IS:

1. A viscoelastic characteristic value-measuring apparatus having an input bar and an output bar arranged in a straight line to hold a specimen made of a viscoelastic material therebetween; first and second strain gauges installed on said input bar to measure an incident strain wave generated when a front end of said input bar is hit and a reflected strain wave; and third and fourth strain gauges installed on said output bar to measure a transmitted strain wave transmitted from said input bar to said output bar through said specimen,

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wherein said input bar and said output bar are made of an viscoelastic material; a length of said output bar is set to a range from 500mm to 2500mm both inclusive; and a length of said input bar is set to a range from 1500mm to 2500mm both inclusive.

2. The measuring apparatus according to claim 1, wherein the length of said output bar is less than that of said input bar.

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3. The measuring apparatus according to claim 1, wherein said input bar and said output bar are made of a polymer.

4. The measuring apparatus according to claim 1, wherein said input bar and said output bar are made of

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a viscoelastic material whose viscoelastic characteristic value is different from that of the specimen in a small degree.

5. The measuring apparatus according to claim 1, wherein said first strain gauge is installed on said input bar at a front side thereof, and said second strain gauge is installed thereon at a rear side thereof, such that said first strain gauge is located between a position spaced at an interval of 10% of a whole length of said input bar from a rear end thereof and a position spaced at an interval of 70% of the whole length thereof from the rear end thereof and that said second strain gauge is located between a position spaced at an interval of 8% of the whole length of said input bar from the rear end thereof and a position spaced at an interval of 62% of the whole length thereof from the rear end thereof.

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6. The measuring apparatus according to claim 1, wherein said third strain gauge is installed on said output bar at a front side thereof, and said fourth strain gauge is installed thereon at a rear side thereof, such that said third strain gauge is located between a position spaced at an interval of 4% of a whole length of said output bar from a front end thereof and a position spaced at an interval of 25% of the whole length

thereof from the front end thereof and that said fourth strain gauge is located between a position spaced at an interval of 8% of the whole length of said output bar from the front end thereof and a position spaced at an interval of 50% of the whole length thereof from the front end thereof.

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7. The measuring apparatus according to claim 1, wherein an interval between said first strain gauge and said second strain gauge is set to a range from 200mm to 1200mm both inclusive; and an interval between said third strain gauge and said fourth strain gauge is set to a range from 30mm to 400mm both inclusive.

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8. The measuring apparatus according to claim 1, wherein said input bar and said output bar are circular and have the same sectional area; and a diameter thereof is set to a range from 10mm to 30mm both inclusive so that the sectional area thereof is larger than that of said specimen by not less than 1.0 time and not more than three times.

9. A method of measuring a viscoelastic characteristic value by using a viscoelastic characteristic value-measuring apparatus according to claim 1, comprising the steps of:

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hitting a front end of an input bar, with a specimen held between a rear end of said input bar and

a front end of an output bar to generate a strain wave including an incident strain wave, a reflected strain wave, and a transmitted strain wave propagating in said input bar, said specimen, and said output bar;

measuring said incident strain wave and said reflected strain wave with first and second strain gauges installed on said input bar, and measuring a transmitted strain wave with third and fourth strain gauges installed on said output bar;

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estimating a history of said incident strain wave at the rear end of said input bar, a history of said reflected strain wave at the rear end of said input bar, and a history of said transmitted strain wave at the front end of said output bar by using a history of said each strain wave;

computing a strain speed history of a specimen, a strain history thereof, and a stress history thereof from said estimated history of said incident strain wave, said history of said reflected strain wave, and said history of said transmitted strain wave and determining a stress-strain curve of said specimen; and

computing a viscoelastic characteristic value such as Young's modulus, a loss factor, and the like from said stress-strain curve.

10. The method according to claim 9, wherein the

strain speed history of said specimen, the strain history thereof, and the stress history thereof are computed by using a viscoelastic constant of each of said input bar and said output bar to determine the stress-strain curve of said specimen.

11. The method according to claim 9, wherein a low-pass filter is used to perform a correction of removing a high-frequency wave having a frequency more than 10kHz from a strain wave measured with said first, second, third, and fourth strain gauges.

12. The method according to claim 9, wherein a zero correction of making a base line value of a history of a strain wave zero is performed.

13. The method according to claim 9, wherein a relaxation time $\lambda$ is derived by using a tangent at a predetermined point of an initial stage of a computed strain history of a specimen after a peak to correct said strain history after said predetermined point;

$$\varepsilon(t) = \varepsilon 0 \cdot e^{-t/\lambda} \quad --- \quad (1) \text{ and}$$

where $\varepsilon 0$ is a strain at the point of contact.

a relaxation time $\lambda$ is derived by using a tangent at a predetermined point of an initial stage of a computed stress history of said specimen after a peak to correct said stress history after said predetermined point;

$$\sigma(t) = \sigma 0 \cdot e^{-t/\lambda} \quad --- \quad (2)$$

where $\sigma 0$ is a stress at the point of contact.

14. The method according to claim 9, wherein a length of a specimen is set to a range from 1mm to 15mm both inclusive.

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15. The method according to claim 9, wherein a front end of said input bar is hit with ~~said~~ impact bar at an impact speed of 1m/s - 70m/s.

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